



McNett – Frontier[™] Emergency Water Filter System

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Device Information

The Frontier Emergency Water Filter System is a filtering straw. The straw is attached to a filtering cartridge that uses an activated carbon block depth filter. The activated carbon filter is a 9 cm long hollow-core cylinder with a 0.5 cm thick wall. Water flows from outside through the filter wall into the hollow inside and out the straw. The filter has a pore size of 2 µm. Directions call for the user to attach the straw to the filter cartridge, fill container with source water, insert filter and drink from straw. Do not submerge or contaminate the drinking end of the straw. Prior to use, carbon particle fines must be removed by drawing water half way up the straw, removing the straw and discarding the water. For storage, the filter should be air-dried for 48 hours before storing.

Effectiveness Against Microbial Pathogens

No data was received showing the effectiveness of this product with respect to the U.S. Environmental Protection Agency (USEPA) Guide Standard Protocol for Testing Microbiological Water Purifiers (reference 1). The device packaging claims removal of *Giardia* cysts, *Cryptosporidium* oocysts, and *E. coli* bacteria. The theory and practice of depth filtration has been widely studied and there has been significant research conducted on activated carbon block filtration (reference 2). In the absence of data specific to this device tested using reference 1, and based on general knowledge of depth and carbon block filtration, this device should be capable of consistently reducing *Giardia* cysts and *Cryptosporidium* oocysts to the required minimum log reductions stated in reference 1 (i.e., 3-log) when used as directed. It is not expected to consistently reduce bacteria (6-log) and viruses (4-log). Based on general depth and carbon block filtration information, the Frontier Emergency Water Filter System is assigned one √ for the reduction of *Giardia* cysts and *Cryptosporidium* oocysts and an X for bacteria and virus reduction (for an explanation of the rating checks [click here](#)).

[™] Frontier is a registered trademark of McNETT Corporation, Bellingham, WA. Use of trademarked names does not imply endorsement by the U.S. Army, but is intended only in identification of a specific product.

Table. Expected Performance Against Microbial Pathogens.

Microbial Pathogen Type	Expected Disinfection Capability	Evaluation Rating	Primary Pathogen Reduction Mechanism
Bacteria	Not Effective	X	-
Viruses	Not Effective	X	-
<i>Giardia</i> cysts	> 3-log	√	size exclusion
<i>Cryptosporidium</i> oocysts	> 3-log	√	size exclusion

Production Rate and Capacity

Inherent to the production rate and capacity of filtration devices is the quality of the raw water source. Because the device operates on human suction, the actual production rate is dependent on the user. The production capacity of the device is stated to be up to 76 L. However, production capacity will vary widely with raw water quality (i.e., turbidity).

Cleaning, Replacement, and End of Life Indicator

This device cannot be cleaned to remove sediment from the filter. When the device becomes unusable due to decreased production rate, the clogged device must be disposed. For practical purposes, the filter cartridge is not cleanable. The device contains no end of life indicator short of filter clogging.

Weight and Size

Dry weight	20 grams
Size (height x diameter)	9.5 cm x 2 cm

Cost

Bottle with filter	\$10.00
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Device Evaluation

No data was received that challenged the Frontier Emergency Water Filter System against reference 1. General research on depth filtration indicates that this device should be capable of consistently reducing *Giardia* cysts and *Cryptosporidium* oocysts. This device is not likely capable of consistently reducing bacteria and viruses. Additional treatment is necessary to remove bacteria and viruses such as adding a disinfectant (e.g., chlorine, iodine, chlorine dioxide) to the water to be treated prior to filtering. The activated carbon should remove tastes and odors. This device, like all filters with small pore sizes, is highly affected by turbid (cloudy) waters. Since the device is not able to be backwashed or cleaned to remove accumulated particulates, once clogged, the filter must be replaced. There is no indicator of process failure or end of device useful life.

Advantages

- Expected to consistently provide adequate protection from *Giardia* cysts and *Cryptosporidium* oocysts, although device-specific testing data using the USEPA protocol is not available.
- No wait time prior to consumption.
- Very simple to use.
- Provides taste and odor reduction.

Disadvantages

- Not expected to be consistently effective against bacteria and viruses.
- Reduced production capacity when using high turbidity water.
- Not backwashable or cleanable.
- No real-time indicator of process failure.

References

1. USEPA, 1989. Guide Standard and Protocol for Testing Microbiological Water Purifiers. *Federal Register*. 54:34067.
2. U.S. Army Center for Health Promotion and Preventive Medicine. (2005). *Technical Information Paper; Filtration in the Use of Individual Water Purification Devices*, Aberdeen Proving Ground, MD.

